SenSym

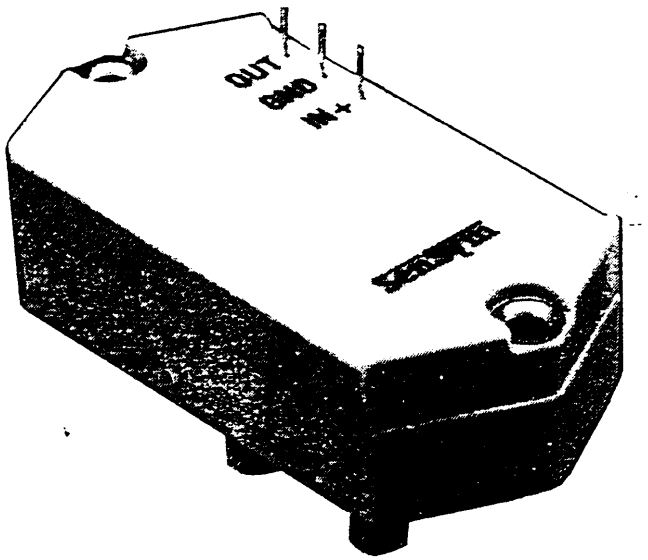
142SC Series

0–1psi to 0–150psi

Signal Conditioned Pressure Transducers

FEATURES

- Improved Performance Replacement for Honeywell/Microswitch 140PC Series
- High Level Voltage Output
- Field Interchangeable
- Calibrated and Temperature Compensated



APPLICATIONS

- Medical Equipment
- Barometry
- Computer Peripherals
- HVAC

GENERAL DESCRIPTION

The 142SC series transducers provide a 1–6V output which is directly proportional to applied pressure. This series consists of eight (8) devices for monitoring differential, gage, or absolute pressures from 0–1 to 0–150 psi. These products feature a high level voltage output, complete calibration and temperature compensation.

Based on Sensym's precision SX series sensors, the 142SC series is an improved performance, direct replacement for the Honeywell/Microswitch 142PC series with equivalent pinout and package mounting dimensions. This allows direct replacement in existing PC board layouts for the Microswitch parts. Sensyms 142SC devices offer the added advantage of tighter tolerances which give greater accuracy and field interchangeability.

These products are designed to be used with non-corrosive, non-ionic gases and liquids. For more demanding or corrosive media applications, Sensym's ST2000 stainless steel isolated family should be used.

FUNCTIONAL SPECIFICATIONS

142SC Series

Maximum Ratings

Supply Voltage	+7 V_{DC} to 16 V_{DC}
Output Current	
Source	10 mA
Sink	5 mA
Temperature Ranges	
Compensated	−18°C to +63°C
Operating	−40°C to +85°C
Storage	−55°C to +125°C

Reference Conditions

Supply Voltage	8.0 ±0.01 V_{DC}
Reference Temperature	25°C
Common-mode Pressure	0 psig

INDIVIDUAL OPERATING CHARACTERISTICS

Sensym Part #	Operating Pressure Range	Proof Pressure	Sensitivity
142SC01D	0–1 psid (g)	20 psig	5 V/psi
142SC05D	0–5 psid (g)	20 psig	1 V/psi
142SC15A	0–15 psia	45 psia	333 mV/psi
142SC15D	0–15 psid (g)	45 psig	333 mV/psi
142SC30A	0–30 psia	60 psia	167 mV/psi
142SC30D	0–30 psid (g)	60 psid	167 mV/psi
142SC100D	0–100 psid (g)	200 psid	50 mV/psi
142SC150D	0–150 psid (g)	200 psid	33 mV/psi

PERFORMANCE SPECIFICATIONS (For All Devices) (Note 1)

Parameter	Min.	Typ.	Max.	Unit
Offset Calibration (Note 2)	0.95	1.0	1.05	V
Output at Full Pressure	5.90	6.0	6.10	V
Full-scale Span (Note 3)	4.95	5.0	5.05	V
Linearity ($P_2 > P_1$) ($P_2 < P_1$) (Note 4)	— —	0.5 0.2	1.5 0.75	%FSO %FSO
Temperature Shift (−18°C to +63°C) (Note 5)	—	0.5	1.0	%FSO
Repeatability and Hysteresis	—	0.2	—	%FSO
Response Time	—	0.1	1.0	ms

Specification Notes:

Note 1: Performance specifications shown are at reference conditions. Specifications apply for absolute pressure devices with pressure applied to Port 1. For gage devices pressure is applied to Port 2 and Port 1 is left open to ambient. For differential pressures, Port 2 is the high pressure port. For operation at other than 8.0 V_{DC} the typical ratiometricity error at 7 to 8 V or 8 to 9 V is ±0.50% FSO and at 9 to 12 V it is ±2.00% FSO. All Sensym differential devices feature dual pressure ports and can be used as gage or differential sensors. For absolute devices, Port 2 is inactive.

Note 2: Offset calibration is at the lowest pressure for each given device.

Note 3: Full-scale span is the algebraic difference between the output voltage at full-scale pressure and the output at the lowest operating pressure.

Note 4: Linearity refers to the best straight line fit as measured for offset, full-scale and 1/2 full-scale pressure.

Note 5: Temperature shift refers to the combined effects of offset and sensitivity shifts. This is tested at −18°C to +63°C relative to 25°C. The maximum temperature shift specification applies to all devices except the 142SC01D devices which have a maximum shift of 1.5% FSO from 5°C to 45°C.

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GENERAL DISCUSSION

Sensym's 142SC series utilizes Sensym's proven SX series sensor element in combination with a custom individually laser trimmed thick film ceramic. Each device is calibrated for offset and sensitivity as well as temperature effects providing an accurate, reliable sensor for a wide variety of sensor applications.

Output Characteristics

The 142SC products give an output voltage which is directly proportional to applied pressure. For the 142SC gage and differential devices, an increasing or positive going output signal will result when increasing pressure is applied to port P2. (For absolute pressure, increases in pressure applied to port P1 produce an increasing output signal. Port P2 is inactive on absolute devices.) For standard 142SC devices the output is ratiometric to the supply voltage. Changes in the supply voltage will cause proportional changes in the offset voltage and full scale span.

User Calibration

The 142SC devices are fully calibrated for offset and span and should therefore require little or no user adjustment in most applications.

Vacuum Reference (Absolute Devices)

Absolute sensors have a hermetically sealed vacuum reference chamber within the sensor chip. The offset voltage on these units is therefore measured at vacuum, 0 psia. Since all pressure is measured relative to a vacuum reference, all changes in barometric pressure or changes in altitude will cause changes in the device output.

Media Compatibility

142SC devices are compatible with most clean dry gases. Because the sensor chip circuitry is coated with a protective silicon gel, many otherwise corrosive environments can be compatible with the sensors. As shown in the physical construction diagram below, fluids must generally be compatible with nylon, aluminum, RTV, and silicon, for use with Port 2. For questions concerning media compatibility, contact the factory.

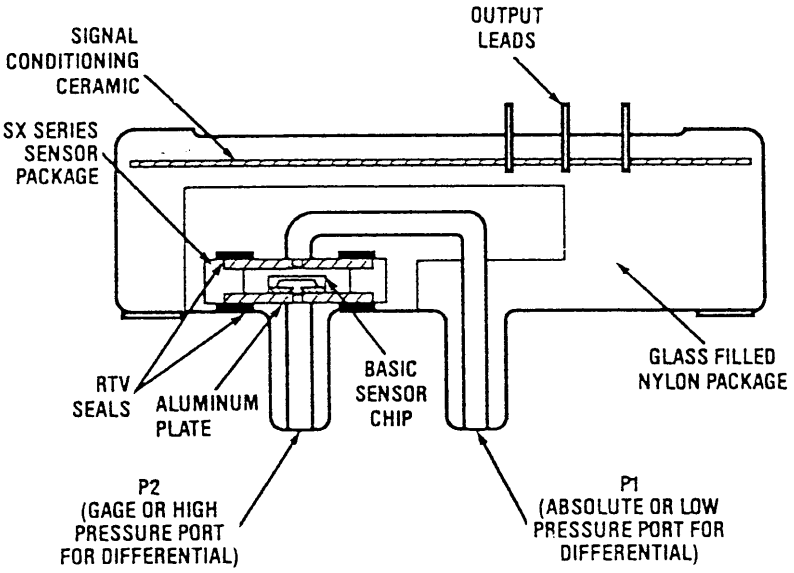
MECHANICAL AND MOUNTING CONSIDERATIONS

The 142SC package is designed for convenient pressure connection and easy PC board mounting. The package has two mounting holes allowing firm PC board connection. Mounting screws or Sensym's plastic X-mas tree clips (Part number SCXCLP) can be used for attachment. (See Application Note SSAN-25).

For pressure attachment, tygon or silicon tubing is recommended.

All versions of the 142SC sensors have two (2) tubes available for pressure connection. For absolute devices, only port P1 is active. Applying pressure through the other port will result in pressure dead-ending into the backside of the silicon sensor and the device will not give an output signal with pressure.

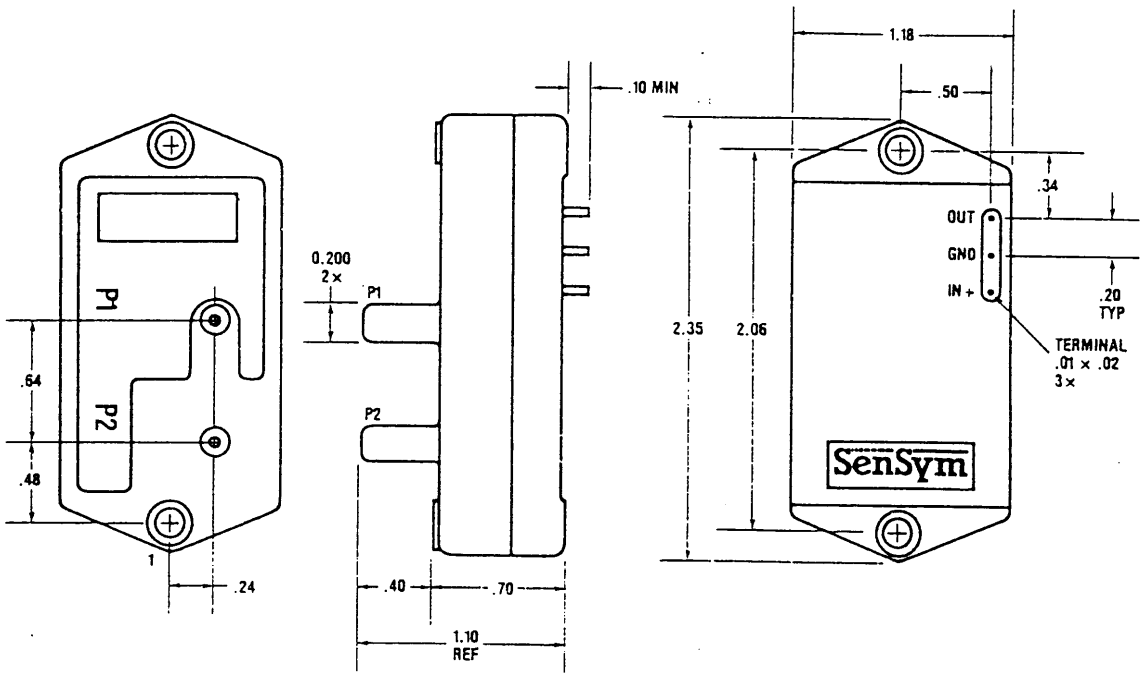
For gage applications, pressure should be applied to port P2. Port P1 is then the vent port which is left open to the atmosphere. For differential pressure applications, to get proper output signal polarity, port P2 should be used as the high pressure port and P1 should be used as the low pressure port.



CUTAWAY VIEW 142SC PACKAGE

MOUNTING DIMENSIONS (For Reference Only)

142SC Series



ORDERING INFORMATION To order, use the following part numbers:

Standard Device Types

Sensym Part #	Operating Pressure Range
142SC01D	0 - 1 psid (g)
142SC05D	0 - 5 psid (g)
142SC15A	0 - 15 psia
142SC15D	0 - 15 psid (g)
142SC30A	0 - 30 psia
142SC30D	0 - 30 psid (g)
142SC100A	0 - 100 psid (g)
142SC100D	0 - 150 psid (g)

Note: All Sensym differential devices feature dual pressure ports and can be used as gage or differential sensors. Sensym's differential (D) devices are therefore interchangeable with the Microswitch differential (D) or gage (G) style devices are also available for vacuum and pressure/vacuum applications. Contact the Sensym factory for details. In addition, devices which offer internal voltage regulators are also available from Sensym.

See Section 5 for Package Styles and Dimensions